

CLAIMS

What is claimed is:

1. A heat exchanger, comprising:

a rotatable drum having first and second ends and a heating section therebetween;

means for feeding a waste stream containing solids and liquids into said first end;

a heater in thermal contact with said heating section for heating said waste stream such that at least some of the liquids in said waste stream are vaporized, leaving solids;

an oxidizing section between said heating section and said second end, for receiving solids from said heating section and contacting said solids with oxygen so as to oxidize any remaining oxidizable material on said solids;

means for removing said solids separately from said vapors; and

means for removing said vapors from said drum separately from said solids.

2. The heat exchanger according to claim 1 wherein said heater comprises a burner and a heating duct coaxial with said rotatable drum, said heating section having a hot end and a cooler end.

3. The heat exchanger according to claim 2 further including a condenser for receiving said vapors from said drum, condensing some of said vapors into a recondensed liquid stream, and feeding an uncondensed portion of said vapors to said burner.

4. The heat exchanger according to claim 2 wherein said means for feeding is coaxial with said rotatable drum.

5. The heat exchanger according to claim 1 wherein said rotatable drum is sealed to prevent the material inside the drum from coming in contact with the atmosphere.

6. A heat exchanger, comprising:

a rotatable drum having first and second ends and a heating section therebetween;
means for feeding a waste stream containing solids and liquids into said first end;
a heater in thermal contact with said heating section for heating said waste stream
5 such that at least some of the liquids in said waste stream are vaporized, leaving solids;
means for removing said solids from said drum separately from said vapors;
means for removing said vapors from said drum separately from said solids; and
an oil spray chamber for receiving said vapors from said drum and contacting said
vapors with an oil mist in order to remove solid particulate matter from said vapors and
10 collecting said oil mist as a solid-containing liquid.

7. The heat exchanger according to claim 6, further comprising a cyclone for separating said solid-containing liquid into substantially solid-free oil and solid-concentrated oil.

8. The heat exchanger according to claim 7, further comprising means for returning said substantially solid-free oil to said oil spray chamber for use as oil mist.

15 9. The heat exchanger according to claim 7, further comprising means for returning said solid-concentrated oil to said drum with said waste stream.

10. The heat exchanger according to claim 9, further comprising means for alternatively charging said solid-concentrated oil to said hot end of said heating section such that some of said solid-concentrated oil is cracked into lower-boiling compounds.

20 Sub A 2 11. The heat exchanger according to claim 6 wherein said burner generates hot exhaust gases and a portion of said hot exhaust gases are used to prevent material vaporized in said heating section from flowing from said heating section to said solids removing section.

12. The heat exchanger according to claim 6 further including a condenser for receiving said vapors from said oil spray chamber, condensing some of said vapors into a recondensed liquid stream, and feeding an uncondensed portion of said vapors to said burner.

13. The heat exchanger according to claim 2 wherein said burner generates hot exhaust gases and a portion of said hot exhaust gases are injected between said heating section and said oxidizing section to prevent back flow of material vaporized in said heating section to said oxidizing section.

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